Migration and reproduction in transitional times: stopping behavior of immigrants and natives in the Belgian city of Antwerp (1810-1925)

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Migration and Reproduction in Transitional Times. Stopping Behaviour of Immigrants and Natives in the Belgian City of Antwerp (1810-1925)

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Abstract: *»Migration und Reproduktion in Übergangszeiten. Stopping von Migranten und Einheimischen am Beispiel der belgischen Stadt Antwerpen (1810-1925)«*. In the course of the nineteenth century, millions of migrants moved to and settled permanently in western European urban centres. This large influx of immigrants, originating from various regions with different demographic backgrounds, affected the level and pace of the local fertility transition. In this study we sampled and analyzed 747 couples consisting of natives and immigrants in the city of Antwerp during the early fertility transition. Stopping behaviour of both native, immigrant and mixed couples is analyzed. We found that adult migrants display stopping behaviour that resembles that at their origin while individuals that immigrated during childhood adapt more often to the dominant local fertility pattern. While the migratory status of the mother was more decisive than that of the father, couples consisting of both immigrants were the last to implement more efficient reproductive strategies. By focusing on individual behavioural patterns, new light is shed on the diffusion of reproductive behaviour during the Western European fertility decline.

Keywords: migration, fertility, stopping, socialisation, adaptation, fertility transition, life course perspective.

Introduction

From the middle of the 19th century onwards, in most Western European populations a transition from high to low marital fertility took place. The fertility transition, resulting in smaller families, took place in the context of industrialization and urbanization (Chesnais 1992; Coale and Watkins 1986). These long-term evolutions, stimulated by technological innovations and economic progress, transformed the premodern, predominantly rural society, a process that went hand in hand with massive migration to urban agglomerations. In 19th

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century Western Europe, urbanization and rural-to-urban migration led to a rapid increase in the number of city dwellers (Hohenberg and Lees 1995).

The link between migration flows and the diffusion of new reproductive behaviour has been on the research agenda for over two decades. Considerable attention has been given to the different aspects of the fertility transition, and the importance of the reproductive behaviour of migrants is widely acknowledged. However, the precise role played by migrant newcomers in shaping the transition remains unclear.

In this paper we aim to re-examine the fertility transition with respect to migration. We will focus on how first-generation immigrants, coming from various regions with different demographic regimes, affected the pace of the fertility transition at their destination, the city of Antwerp. Although recent research in historical demography mainly focuses on intentional spacing strategies (Bengtsson and Dribe 2006; Van Bavel 2004a; Van Bavel and Kok 2004), it is still commonly accepted among historical demographers that stopping behaviour was one of the most important elements of the European fertility transition (Reher and Sanz-Gimeno 2007; Knodel and van de Walle 1986). By putting the focus of our study on stopping patterns, new light can be shed on the process of the fertility decline in Western Europe.

The setting of this research is the Belgian city of Antwerp. During the second half of the 19th century Antwerp transformed from a regional textile centre into an expansive world port, attracting a steadily increasing number of immigrants. As a result Antwerp rapidly became Belgium's biggest and fastest growing city at that time, growing from 88,000 inhabitants in 1846 to 273,000 in 1900. In this urban centre fertility decline started fairly early, compared to the surrounding areas (Lesthaeghe 1977, 102-19). This fact, combined with the accessibility of high quality historical sources allows for a profound investigation of individual migrants' reproductive behaviour.

Migration and Fertility

The fertility transition in Western Europe was characterized by a shift in the mechanism of population control. From restriction of marriage in pre-transitional societies, fertility was now controlled within marriage by ceasing childbearing when an ideal family size had been reached. To achieve this, both parity-specific and parity-independent control were applied. Parity-specific control refers to couples avoiding subsequent births after reaching a desired family size, while parity-independent control relates to spacing out subsequent births, regardless of the total number of children (Coale 1986; Henry 1961; Knodel and van de Walle 1986). Especially during the early-transitional period, stopping behaviour was almost entirely responsible for the decline in number of births. At a more advanced stage of the transition, stopping accompanied by birth spacing became the principal strategy for fertility limitation (Reher and Sanz-Gimeno 2007).

Before the fertility transition, regional differences in demographic systems already created a diverse landscape in Europe (Livi Bacci 1999; Flinn 1985). Due to differences in the timing of the onset (Coale and Treadway 1986) and the speed of the fertility transition (Chesnais 1992), interregional demographic variation increased during the fertility decline. During the past decades, many scholars have emphasized the importance of migration for the fertility decline and its diffusion throughout 19th century Western Europe (Alonso 2000; Eggerickx 2001; Lee 2000; Moch 1992; Oris 1996; Perrenoud 1995; Reher and Iriso-Napal 1989; Sharlin 1986). During this time, individuals moved between geographic areas which were characterized by a high diversity in demographic behaviour. Millions of immigrants, mostly originating from a countryside characterized by pre-transitional reproductive behaviour, settled in urban centres where family limitation progressed faster (Sharlin 1986). Confronted with new fertility patterns, migrants either gradually adapted to the dominant fertility behaviour of the local population or kept behaving according to their region of origin. Migrants' childbearing behaviour contributed to the overall fertility of their new environment, and thus to the pace of the fertility transition at arrival.

The new social environment directly or indirectly shaped the reproductive life course of migrants as well. This relationship is theorized by Kulu (2005) in four major hypotheses. In the socialisation hypothesis, the transmission of attitudes and values from one generation to another are dominant. Migrant's fertility behaviour reflects the dominant fertility preferences of their childhood environment, so they kept behaving according to the stayers at origin. It is only in the next generation, with second generation immigrants, that convergence towards the fertility levels at destination takes place. In contrast with this, the adaptation hypothesis states that attitudes towards childbearing may change over the life course and that individual re-socialisation is possible. Sooner or later, the fertility behaviour of migrants will conform to the dominant behaviour at destination. In the selection hypothesis, migrants are viewed as a specific group with fertility preferences already more similar to those at destination than at origin. Finally, the disruption hypothesis suggests short-term fertility-lowering effects among migrants due to the disruptive factors associated with the migration process (Kulu 2005).

During the European fertility transition, parity-dependent stopping behaviour has been widespread adopted. The diffusion of this new reproductive behaviour can be affected by migration. Migrants, having ties with both local (at origin) and the new community (at destination) might have a catalyzing function, channelling attitudes and practices from one demographic regime to the other (Van Bavel 2004b). By focusing in this study on specific reproductive behaviour – such as stopping – we advance our understanding of the diffusion of new reproductive behaviour during transitional times.

The Antwerp Port City

During the 19th century, Antwerp underwent major socio-economic and demographic transformations. In the first half of the 19th century a shortage of investments made the local textile production collapse (Jeuninckx 1964; Lis 1986). Antwerp, which used to rely on its textile industry, transformed during the second half of the 19th century to a port city with an international reputation. From 1850 onwards, Antwerp evolved from a gateway to the inland to an international turntable, characterized by an intensified import and export of goods (Veraghtert 1986). Both external and internal factors were responsible for this expansion. A good business climate and competition from neighbouring ports (such as Rotterdam), along with a continuous industrialization in Belgium, the rapid transformation of the Rhine district (Germany) and the invasion of European markets with cheap foreign grain were important external stimuli. Internally, local initiatives were taken to boost the Antwerp industrial and commercial activities. The early expansion of the railway system[1] – Belgium was the first country on the continent to develop its railway system – promoted these market opportunities even more. The concentration of economic activity, together with rising employment in the port and a strong population growth created a favourable environment for the establishment of various industrial activities. In 1896, more than two thirds of the industrial employment in the province of Antwerp was located in or in the direct vicinity of the port city (Loyen 2003; Van Klink 2003; Veraghtert 1986).

The rapid expansion of Antwerp and its transformation to a world port completely changed the labour market structure. Irregular employment in the harbour, and the demand for workers with good physical strength and endurance made the native, unemployed textile workers often unfit or unwilling to work in the Antwerp port (Lis 1986). The female labour opportunities as cotton spinster or lace maker also became increasingly scarce, and more and more women practiced a job in the service sector, often linked to one of the port activities (e.g. fish seller, hawker, etc.). Due to its transformed job market with irregular jobs for unskilled workers, the Antwerp port became an attraction pole for (mainly male) migrants during the 19th century. The establishment of several labour unions for migrant harbour workers ("naties"), based on the origin of migrants, further increased employment opportunities for newcomers (Van Isacker 1966; Vanfraechem 2005; Winter 2009).

During the 19th century, the city of Antwerp also underwent a demographic expansion. In the first half of the 19th century, the Antwerp population – consisting of around 55,000 inhabitants in 1800 – increased strongly. Especially in

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[1] The first railway traffic between Antwerp and Mechlin took place on the 3rd May 1836. In the following years, the railway system was enlarged to Liege and the German border (Asaert 2007a).

the latter half of the nineteenth century the city's population exploded: the port town grew from about 88,000 inhabitants in 1846 to 273,000 people at the end of the 19th century (Vrielinck 2000: 1680-1681 and 1668-1669). With an annual growth rate as large as 2.1 per cent, Antwerp developed into the biggest and one of the fastest growing cities of Belgium.

The strong population growth in Antwerp during the 19th century was achieved through both strong natural and migratory growth (figure 1). The crude birth rate, which was always higher than the crude death rate[2], increased dramatically during the second half of the 19th century. Because of an earlier decline in the crude mortality rate, natural increase was the strongest during the period 1871-1890 (Kruithof 1964). Besides natural growth, demographic expansion in the city of Antwerp was mainly due to immigration. From the 1840s onwards, the large influx of immigrants caused a significant rise in the migratory increase, which massively affected the population growth in the city of Antwerp.

These population dynamics had a strong impact on the social life of the Antwerp population. Fluctuations in rents and the shortage in the local housing market forced poor people into the overcrowded streets and slums and increased the appeals for public charity (Lis 1969; Lis 1986; Vercauteren 2001; Winter 2011). The thousands of immigrants who were looking for new employment opportunities in Antwerp were often confronted with housing, hygiene and integration problems (Asaert 2007b; Lampo 2002). During the last decades of the 19th century, these problems worsened by the passing through of more than one million European emigrants, who came to Antwerp to emigrate with the Red Star Line to the 'New World' (Asaert 2007c; Veraghtert 1986; Vervoort 2005).

Source: the COR*-database

Analyzing migrants' stopping behaviour requires detailed individual-level measures. The data for this study stems from the Antwerp COR*-database, a recently available historical demographic database, containing longitudinal and intergenerational data at the individual level. The database spans nearly eight decades (from 1846 to 1920) and covers three successive generations (cohorts 1820-1870), living and giving birth in Antwerp and the surrounding countryside (Matthijs and Moreels 2010).

The database is based on a sample of surnames. After ample evaluation of different two- and three-letter combinations, all family names starting with the letter combination cor* – have been chosen. Individuals bearing such names

[2] With the exception of the years 1848-1849, 1859 and 1866, where Antwerp was hit by cholera epidemics.

(for example Coremans, Corluy, Cornelissens, etc.), were selected. Co-resident relatives were sampled as well, even if they did not have a COR* family name. Information stems from both the population registers and vital registration records (birth, marriage and death certificates). The Belgian population registers, known for their high quality registration, were set up to follow individuals and household through time and space. From 1846 onwards, all household changes such as births, deaths, marriages (and divorces), and migratory movements within and between communities were recorded on a continuous basis (Gutmann and van de Walle 1978; Leboutte and Obotela 1988). The registers contain information on family relationship, occupation and nationality as well. The head of the household was always listed first, followed by spouse, children, relatives, and others not kin-related to the family, such as servants or lodgers (Bracke 2008). In the COR*-database information from the population registers was supplemented with vital registration records, which are considered even more reliable regarding dates (Gutmann and van de Walle 1978) and allows to track down individuals which did not appear in the population registers (for example stillbirths). Individual life courses were reconstructed using nominal record linkage. The Antwerp COR*-database totals more than thirty thousand individual life courses, enriched with extensive micro-data on kin presence, household formation and migration processes (Matthijs and Moreels 2010), which allows for in-depth analyses of fertility behaviour of both natives and migrants.

Fertility in Antwerp – Descriptive Measures

Despite the regional heterogeneity, Belgium was characterized by a pre-transitional, Malthusian society until about 1870, after which marital fertility started a strong and steady decline (Lesthaeghe 1977). In the Antwerp region (see map 1), fertility was high up until 1880 and declined continually in the following decades. Within the city of Antwerp, however, marital fertility levels were already visibly lower compared to the surrounding countryside (Lesthaeghe 1977, 102-19).

Descriptive fertility measures based on the Antwerp COR* sample confirm this fertility pattern in the Antwerp surroundings. Figure 3 depicts the long-term evolution in mean crude parity for the Antwerp area. Only fertile couples with complete reproductive histories are included in the analysis[3]. During the studied period (1810-1925), couples in the city of Antwerp give birth to on

[3] Only those couples were taken into account of which both partners were married for the first time, of which the wife survived until the age of 45, and the husband did not die before the end of his wife's reproductive period. Illegitimate children were not taken into account.

average 4.55 children, while in the Antwerp countryside couples have a significantly higher average of 5.26 births[4].

The onset of the fertility transition in the Antwerp city is visible from 1870 onwards, while in the surrounding area the fertility decline started twenty years later (from 1890 onwards). In the city the mean parity decreased from 6.2 to 2.4 children per couple in about three decades of time. Just before the final fertility decline in the city a brief period of increased fertility is visible. This "ski jump" is not uncommon and has been detected in several other historical settings (Alter, Oris and Neven 2007; Dyson and Murphy 1985; Knodel 1988).

Individual-level measures for the Antwerp city reveal a difference in mean parity among native and migrant couples[5] (table 1). During the 19th century migrant couples in the port city generally had a somewhat higher number of births (4.61) than native couples (4.47). However, combining the migratory status of the spouses with gender – only father migrant versus only mother migrant versus both spouses migrant – reveals clearly distinct patterns. Couples with a migrant mother and a native father had on average 5.20 births, which is significantly higher than native Antwerp couples (4.47)[6]. On the other hand, when only the father or both spouses were migrant, the mean parity was lower than the natives (respectively 4.26 and 4.33). This finding draws attention to the gendered decision-making process in birth control strategies.

Both during the first and later stages of the fertility transition, couples reduced the number of children by preventing further pregnancies when the desired offspring size was reached (Reher and Sanz-Gimeno 2007). In this way, women did not use the full length of the reproductive phase anymore. We found this to be the case in the city of Antwerp as well (see figure 4). Towards the end of the examined period, the age at last birth decreased significantly from a mean above 39 years prior to 1850 to a mean around 31 at the beginning of the twentieth century. The age at first birth declined moderately during the whole period: the mean age evolved from around 27 years (mid 19th century) to 25 years (end of 19th century). Mainly as a consequence of the steady and sharp decline in the age at termination of childbearing, the duration of reproduction shortened. The overall reproductive period evolved from about 11 years before 1860 to around 8 years during the following decades, and shortens dramatically (to around 5 years) at the turn of the century. Women in the Antwerp city ended their reproductive period earlier during transition times.

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[4] Two-sample t (974) = -3.3, $p < 0.001$.

[5] In this research, native couples are couples where both spouses were indigenous inhabitants of the Antwerp port city. Migrant couples consist of spouses who went to the port city of Antwerp (i.c. first-generation migrants) and who had the majority of their children inside the city.

[6] Two-sample t (295) = -1.8, $p = 0.037$.

A more detailed look demonstrates differences between native and migrant couples in the Antwerp city. Figure 5 presents the variation in duration-related fertility indicators (i.e. age at first/last birth) for natives and migrants over time. Prior to 1870, age at last birth differs only limited between natives and migrants. After the onset of the transition native couples ceased childbearing earlier than migrant couples, with a growing discrepancy of over 2 years. In the port city of Antwerp, migrants embarked on average 2 years later on matrimony than natives (Moreels and Matthijs 2011). This variation in age at marriage is also reflected in the timing of the first birth. During the research period, age at birth of the first child declined from above age 28 to age 26 for migrant couples, while natives were more than 2 years younger at their first birth throughout the whole period (evolution from age 26 to around 24). In consequence, the overall reproductive period of migrants was shorter than that of native couples, and reduced the average reproductive period in the city of Antwerp.

In the previous section an interesting link was shown between the origin of husband and/or wife, and reproductive behaviour. By looking at the timing of the final child among various migrant couples, we try to answer the question of what determined different fertility levels in the city of Antwerp. Was migratory status – being native versus migrant – decisive for stopping patterns, and how crucial is the parental position of the migrant for someone's fertility behaviour?

Table 2 displays the timing of the last birth for different couples in the Antwerp city. During our research period, native couples were significantly younger than migrant couples at the birth of their last child (mean difference of 1.31 years). By differentiating migrant couples by origin of the spouses, i.c. mother and/or father being native or migrant, specific stopping patterns appear. Couples consisting of a native mother and a migrant father resemble the native behaviour the most (mean difference of only 0.62 years) while couples with a migrant mother or where both parents are migrant are significantly older (respectively 1.42 and 1.66 years difference) than the Antwerp stayers. This finding supports the theory that the migratory status of the mother is more decisive for the stopping behaviour than father's migratory status.

Explaining Stopping

In order to identify the effect of a migrant background on stopping behaviour in Antwerp, multivariate logistic regression is applied[7] (Menard 1995). In this study 747 families are selected and analyzed. In 303 couples (41 per cent) both parents are natives, in 111 couples (15 per cent) only the father is an immigrant, in 157 couples (21 per cent) only the mother is an immigrant, and in 176

[7] This method has previously been applied by Van Bavel (2004b and 2007).

couples (24 per cent) both parents are immigrants. The dependent variable is the probability that the current birth interval for a given family remains open, i.e. the (logit of the) probability that no additional child is born within five years after the previous birth. The five-year limit prevents reduction and distortion of our sample and corresponds to the fact that hardly any children are born more than five years after the previous one (Van Bavel 2004b). In all models we controlled for intragroup correlation on the level of the family (because we included all birth intervals of the family). In order to test the migration-fertility relationship, we included the region of origin and the age at immigration to the Antwerp city. Based on the above descriptive findings, the migratory status will be assessed using first the couple as a whole, and second using information on the individual spouses.

Table 3 provides basic descriptive statistics on the covariates used in the analysis. The first model, the base model, controls for natural fertility determinants (mother's age, age difference between spouses), attained parity of the couple, life status of the index child, occupational status of the household head and time period (see table 4). The base model is extended into model 2 and 3, where variables are added on the migratory status of both spouses.

Mother's age is strongly associated with her fecundability, which results in an increased risk for another child at young age and a low(er) chance at older age (Larsen and Vaupel 1993). The models in table 4 confirm this pattern. Before the age of 30, the risk of having no additional child is minimal, while after age 35 and especially above 40 there is an increased risk for women to stop childbearing. When the wife is older than her husband, stopping behaviour is half as likely compared to women having the same age, or being younger than their husbands. This significant result in age difference between spouses shows how birth control is bargained between spouses and reflects the power relations within families (Mackinnon 1995).

The significant effect of the crude parity is as expected: the chance for an additional child is higher when the couple already had more children. Moreover, clear evidence is also found on the life status of the index child. If the lastborn child died, the odds for stopping increase significantly. In the literature it has been suggested that the death of the last child reduces the chance of stopping due to a replacement strategy, suggesting emotional arguments and/or the urge to reach a target family size (Kemkes 2006). Our results indicate that young age mortality does not always result in replacing the deceased child: in Antwerp there is an increased chance that reproduction is coming to an end.

The odds on socio-economic status confirm results from previous studies (Van Bavel 2002). Households with a high socio-economic status have a tendency for early stopping, while a lower social status reduces the odds for stopping. Compared to unskilled workers, farming families reproduce on average significantly longer.

The period effect is a strong explanatory variable in all three models. During the early stage of the fertility transition (period 1870-1890), the odds to stop childbearing are more than 60% higher than during the pre-transitional period. During the later stage of the fertility transition, the odds are even doubled. This indicates that, all other factors remaining equal, couples in Antwerp ceased childbearing earlier at the end of the 19th century than in pre-transitional times.

In model 2 a couple migration variable (native vs. migrant couple) is added to the model, while in model 3, a variable with the migratory status of the individual spouses (both natives; only husband migrant; only mother migrant; both migrants) is taking into account. Both variables improve the base model (increase of pseudo R^2). Compared to native couples, migrant couples cease childbearing later on in life, which confirms the descriptive findings on the timing of the last birth. When looking at the migrant status of the spouses (model 3), small differences in the odds can be identified. Of all non-natives, the lowest odds (respectively 0.768) are found when both parents are migrant, meaning that this group has the latest stopping. Although mixed couples (where exactly one of the parents is a migrant) seem to have later stopping as well, in a multivariate environment they do not differ significantly anymore from native couples.

Table 5 shows the results of four models, one for each group by origin of the individual spouses: both natives, mother native and father migrant, mother migrant and father native, and both migrants. The results on the natural fertility determinants and parity are comparable with the findings in the previous table. For the other controlling variables, some specific aspects can be highlighted. When the lastborn child died, natives and couples with both parents migrants stop childbearing about three times faster than when the child survived.

For the both migrant couples, the risk of stopping is higher for foremen and skilled workers than for unskilled workers. If only the father is migrant, lower-skilled workers have another child twice as often as unskilled workers. When the father is native and employed in the agricultural sector, parents are about four times less likely to display early stopping behaviour than unskilled workers.

Couples with a native mother and migrant father see their chances of stopping doubled (early stage of transition) and even tripled (later stage of transition) compared with the pre-transitional period. This period pattern is also visible, be it less strongly, with the native couples (odds of 1.880 and 2.497) and couples with a migrant mother and native father (odds of 1.663 and 2.357). There is no significant period effect when both spouses are migrants, which indicates that this group is the slowest to display modern fertility behaviour (as was concluded from table 4, cfr. supra).

Individual migration characteristics such as the place of origin or the age at immigration demonstrate how migrant's childbearing behaviour influenced the fertility transition in the city of Antwerp. In table 6 attention is given to the region of origin of both parents. The fifth model demonstrates the results for all couples, while the following three models (models a, b and c) only display the findings for each migrant group (couples with only father or only mother or both parents migrant).

The model for all couples shows that women who were born in the region surrounding the city had a higher chance for another birth (or lower chance to stop) than the native Antwerp mothers, although that effect is not significant. Moreover, mothers originating from other Flemish regions are less likely to stop further reproduction (odds 0.815), while women coming from the French speaking part of the country and Brussels stopped somewhat earlier than the Antwerp mothers. This corresponds to aggregate Belgian indicators showing the earliest decline in fertility in the Walloon (French-speaking) provinces, followed by the urban area of Brussels and lastly affecting the Flemish districts (Lesthaeghe 1977). Mothers coming from the Netherlands and other foreign countries had reduced odds of stopping (odds respectively 0.606 and 0.648), except for French women, who for every given parity have a three times higher risk of not having another child (odds of 3.189) than Antwerp mothers. Knowing that France was about 60 years ahead of Belgium in terms of the fertility decline and about 70 years ahead of the Netherlands (Lesthaeghe 1977), it is not surprising that women coming from France show more distinctive stopping patterns than Antwerp mothers. When fathers originate from the Antwerp surroundings, being born in a semi-rural district area decreases the odds of stopping significantly to 0.691. Fathers originating from other Belgian places (Flemish, Walloon or Brussels area) have also a lower chance on stopping. The results for French and Dutch men are not significant.

At first sight the findings for migrants (models a, b and c) do not yield many significant results. However, these analyses can learn us something useful: when the father is a migrant and the mother a native, the odds of stopping are twice or even three times higher than among the native Antwerp couples. Migrant mothers marrying with a native on the other hand have reduced odds (except for French women) on stopping, especially when they originate from the Netherlands (odds of 0.319). These multivariate results confirm the importance of the mother's migratory status for the reproductive behaviour. Couples where both parents are migrants in general are more likely to have another child, so they stop childbearing later on in life.

An in-depth look at the effect of origin reveals that different groups of migrants each wrote their own demographic histories. In an earlier study we found this to be true with respect to family formation, and age at first marriage (Moreels and Matthijs 2011). In this study, it can be concluded again regarding childbearing (stopping) patterns. During the 19th century, first-generation immigrants coming from (post-)transitional areas were the first to stop childbearing. Immigrants originating from pre-transitional regions kept on reproducing in the port city of Antwerp, and therefore blur our vision on the fertility transition at the aggregate city level. This finding supports the socialisation hypotheses, where migrants' fertility behaviour resembles to the fertility levels at origin.

When do first-generation immigrants keep showing fertility behaviour according to their origin, and when do they adapt to the new social environment? Including the timing of immigration may predict whether a migrant socializes with (the former) or adapts to (the new) reproductive behaviour. Arriving as child in a city characterized by transitional fertility levels influences the individual's childbearing pattern later on in life, while individuals arriving at older age may already have specific values and attitudes towards fertility and birth control, and thus more resilient to behaviour at destination.

Model 6, which presents results for all groups and by migrant group (see table 7), focuses on the age at immigration to the port city of Antwerp. The model for all couples (first column) shows that stopping behaviour is affected by the age of arrival in the port city. When immigrating at young ages (i.c. before the age of 15), both men and women have increased odds for stopping. However, immigration to Antwerp at older ages – especially after marriage – significantly stimulated further reproduction (odds of respectively 0.631 for women and 0.648 for men). This pattern is very clear when one of the spouses is a migrant. Immigrant mothers for example are 1.591 times more likely to end reproduction when arriving as a child in the city of Antwerp, while arriving as an adult stimulated further reproduction. Furthermore, couples consisting of both migrants keep reproducing later on in life. With their highest ages at first birth (mean of 27.32 years) these couples lag behind when it concerns fertility. By stopping the latest, these immigrants respond to disruptive factors that are associated with their arrival in the city.

The above findings were further confirmed by modelling origin and timing of migration simultaneously, and this for each migrant group (results not shown here). Both origin and timing of migration prove crucial for later reproductive behaviour: individuals immigrating as child to the Antwerp city adapt to the dominant transitional behaviour at destination, while immigrants arriving as (married) adult keep behaving according to the stayers at origin. This is not only so for internal migrants, international migrants' reproductive behaviour is affected by this pattern as well.

Conclusion

This article explores the relation between migration and the pace of the fertility transition in 19th century Western Europe, tested for the city of Antwerp. The focus is on individuals' stopping behaviour, hereby allowing to disentangle the impact of a new social environment on the childbearing behaviour of first-generation immigrants.

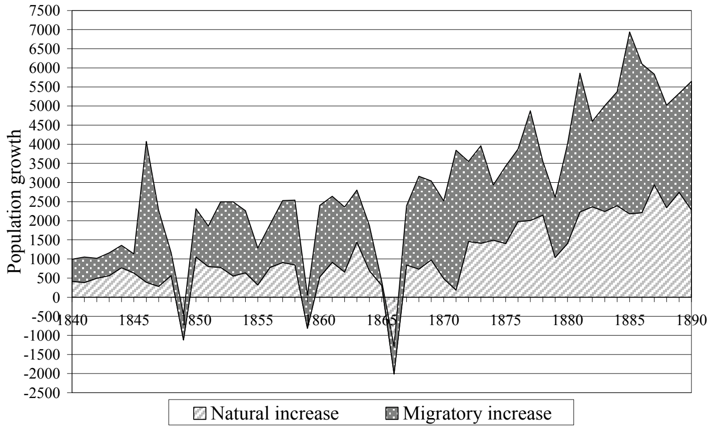
In times of modernisation, migrants originating from regions characterized by various demographic regimes were confronted with a different fertility pattern at destination. Some immigrants kept behaving like their childhood environment, while others change their reproductive behaviour over the life course and adapt (i.c. re-socialise) to the reproductive behaviour of natives at destination. By analyzing data from a historical longitudinal database containing detailed information on the individual life course in an urbanizing setting, a contribution to a better understanding of the migration-fertility theories (socialisation, adaptation, selection and disruption hypothesis) during transitional times is made.

During the second half of the 19th century, massive migration transformed the port city of Antwerp. Migrants, originating from various local and international settings, immigrated to the city and affected the fertility transition in their place at arrival. In the city of Antwerp, stopping played a major role during the early and later stages of the fertility transition. By taking general and individual migration variables into account, we discovered that native mothers – marrying a native or migrant spouse – were pioneers in stopping. The migratory status of the father was less important, and only had influence if the mother was a migrant as well. In an age of male dominance, it is the mother that is decisive in private decisions such as the practice of birth control. This was already suggested in Janssens (2007), and is now confirmed in a context of migrant's integration. Originating from pre-transitional and (post-) transitional societies had a great impact on stopping behaviour. Especially at older age, reproductive behaviour is strongly influenced by the fertility levels dominant in the childhood environment. Immigrants' stopping behaviour at destination resembles that at origin, despite the size of the differences in fertility patterns between both origin and destination (socialisation hypothesis). On the other hand, immigrants arriving as a child in Belgium's largest port city adapt to the fertility levels of natives at destination (adaptation hypothesis). No evidence was found supporting the selection hypothesis, which states that immigrants were already a specific group with fertility preferences similar to those at destination. Couples with one migrant spouse ceased childbearing earlier, whereas couples with two migrant spouses lag behind and reflect stopping behaviour that can be connected to the disruption hypothesis.

In times of fast urbanisation, large numbers of immigrants settled in urban centres. The resulting urbanisation not only stimulated population growth in cities, but also affected reproductive behaviour and the pace of the fertility transition in those cities. This study demonstrates that various groups of migrants each display specific stopping behaviour patterns. While immigrants coming from pre-transitional areas delayed reproductive change, those coming from transitional regions stimulated birth control strategies. Limited groups of migrants – raised and socialized in transitional societies – were exposing natives to key attitudes and behaviours related to fertility, either by formal or informal social interactions. How the diffusion of new, transitional reproductive behaviour from migrants to natives worked, and under what conditions it took place, still remains unanswered. More detailed research, for example focusing on migrant's residential patterns at the neighbourhood or street level, might improve our understanding of how innovative demographic behaviour was spread during the European fertility transition.

Appendix

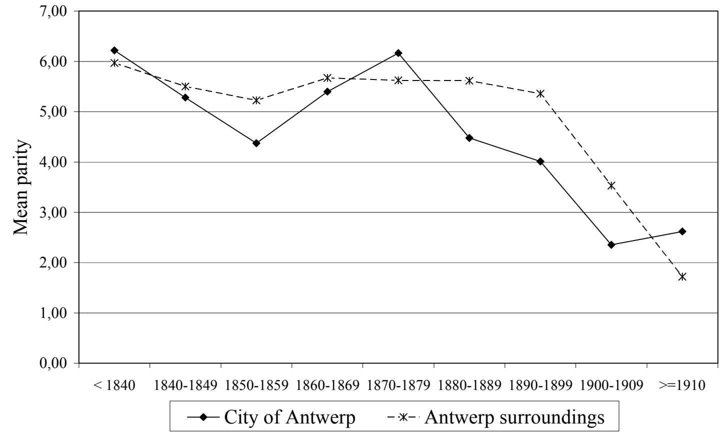
Figure 1: Population Growth in the City of Antwerp, 1840-1890



Source: City reports of Antwerp.

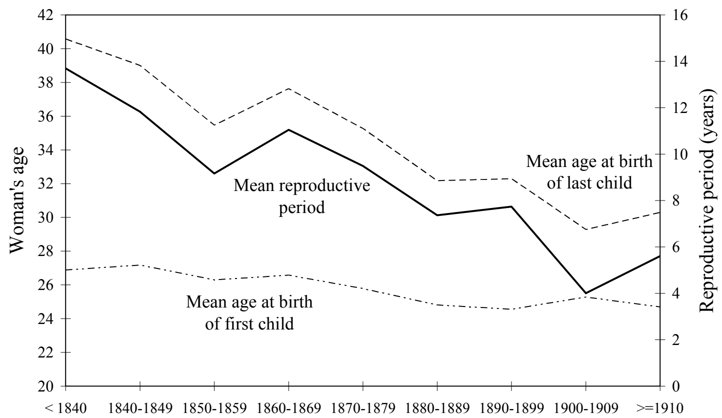
Figure 2: Map of Belgium Detailing the Sampled Research Area, ca. 1900

Figure 3: Mean Parity in the Antwerp Area, 1810-1925



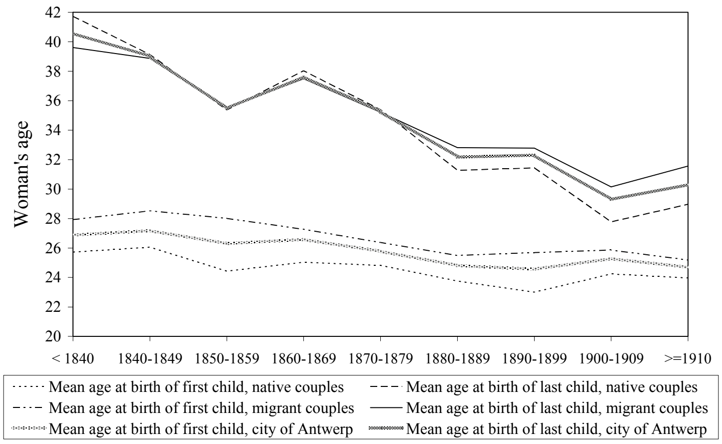
Source: Antwerp COR*-database, release August 2010.

Figure 4: Duration of Reproduction in the City of Antwerp, 1810-1925



Source: same as Figure 3.

Figure 5: Duration-related Fertility Indicators in the City of Antwerp, Native Versus Migrant Couples, 1810-1925



Source: same as Figure 3.

Table 1: Mean Parity, City of Antwerp, 1810-1925

Mean parity	Mean	Std. Err.	95% CI		Difference with natives	Sign.
City of Antwerp	4.55	0.14	4.28	4.83		
native couples	4.47	0.23	4.01	4.93	(ref.)	
migrant couples	4.61	0.18	4.26	4.95	0.13	
mother native father migrant	4.26	0.31	3.65	4.86	-0.21	
mother migrant father native	5.20	0.35	4.52	5.88	0.73	p<0.05
both parents migrants	4.33	0.26	3.83	4.83	-0.14	

Source: same as Figure 3.

Table 2: Timing of the Last Birth, City of Antwerp, 1810-1925

Age of mother at birth of last child	Mean	Std. Err.	95% CI		Difference with natives	Sign.
City of Antwerp	33.25	0.28	32.70	33.79		
native couples	32.45	0.47	31.53	33.36	(ref.)	
migrant couples	33.76	0.35	33.08	34.43	1.31	p<0.05
mother native father migrant	33.07	0.68	31.74	34.40	0.62	
mother migrant father native	33.86	0.61	32.66	35.07	1.42	p<0.05
both parents migrants	34.11	0.52	33.09	35.13	1.66	p<0.05

Source: same as Figure 3.

Table 3: Descriptive Statistics for Birth Intervals Used in Analysis of Stopping Behaviour, City of Antwerp, 1810-1925

	N (mean)	% (S.E.)
Age of mother		
15-24	634	20.90
25-29	802	26.44
30-34 (ref.)	598	19.72
35-39	411	13.55
>=40	203	6.69
no exact date known	385	12.69
Age difference between spouses		
husband is younger than wife	687	22.65
husband same age or < 6 years older than wife (ref.)	1,377	45.40
husband is older than wife by 6+ years	427	14.08
missing information	542	17.87
Parity	(3.74)	(0.05)
Life status of index child		
alive (ref.)	2,515	82.92
died within 2 years	479	15.79
died after 2 years	39	1.29
Socio-economic status of father		
elite and middle class	602	19.85
foremen & skilled workers	480	15.83
lower-skilled workers	449	14.80
unskilled workers (ref.)	1,106	36.47
farmers, fishermen and farm workers	91	3.00
no occupational registration	305	10.06
Period		
< 1870	1,146	37.78
1870-1890	811	26.74
> 1890	1,076	35.48
Migration status in city of Antwerp		
native couple (ref.)	1,215	40.06
migrant couple	1,818	59.94
migrant couple – only father migrant	451	14.87
migrant couple – only mother migrant	704	23.21
migrant couple – both parents migrant	663	21.86
Region of origin of mother		
city of Antwerp (ref.)	1,928	63.57
Antwerp district, rural area	58	1.91
Antwerp district, semi-rural area	155	5.11
Antwerp district, urban area	103	3.40
Flemish provinces	559	18.43
Walloon provinces or Brussel	110	3.63
The Netherlands	65	2.14
France	3	0.10
Other foreign countries	27	0.89
Unknown	25	0.82
Region of origin of father		
city of Antwerp (ref.)	1,761	58.06
Antwerp district, rural area	86	2.84

Table 3 continued…		
	N (mean)	% (S.E.)
Antwerp district, semi-rural area	157	5.18
Antwerp district, urban area	138	4.55
Flemish provinces	535	17.64
Walloon provinces or Brussel	51	1.68
The Netherlands	44	1.45
France	21	0.69
Other foreign countries	59	1.95
Unknown	181	5.97
Age of mother at immigration to Antwerp		
native (ref.)	1,928	63.57
before age <15	132	4.35
after age 15 & before marriage	456	15.03
after marriage	370	12.20
no exact date known	147	4.85
Age of father at immigration to Antwerp		
native (ref.)	1,761	58.06
before age <15	159	5.24
after age 15 & before marriage	495	16.32
after marriage	301	9.92
no exact date known	317	10.45
N birth intervals	3,033	
… of which open (no child within 5 years)	620	

Source: same as Figure 3.

Table 4: Logistic Regression of the Probability of Birth Stopping, City of Antwerp, 1810-1925

	MODEL 1			MODEL 2			MODEL 3		
	Odds Ratio	P-value		Odds Ratio	P-value		Odds Ratio	P-value	
Age of mother									
15-24	0.183	0.000	***	0.179	0.000	***	0.177	0.000	***
25-29	0.434	0.000	***	0.429	0.000	***	0.429	0.000	***
30-34 (ref.)	1	/		1	/		1	/	
35-39	2.111	0.000	***	2.124	0.000	***	2.142	0.000	***
> = 40	19.050	0.000	***	19.263	0.000	***	19.273	0.000	***
no exact date known	0.909	0.691		0.878	0.588		0.885	0.608	
Age difference between spouses									
husband is younger than wife	0.561	0.000	***	0.554	0.000	***	0.552	0.000	***
husband same age or < 6 years older than wife (ref..)	1	/		1	/		1	/	
husband is older than wife by 6+ years	1.012	0.916		1.026	0.825		1.033	0.778	
missing information	0.794	0.311		0.788	0.295		0.785	0.287	
Parity	0.676	0.000	***	0.674	0.000	***	0.673	0.000	***
Life status of index child									
alive (ref.)	1	/		1	/		1	/	
died within 2 years	1.681	0.005	***	1.698	0.005	***	1.699	0.005	***
died after 2 years	2.799	0.000	***	2.814	0.000	***	2.794	0.000	***

Table 4 continued…

Socio-economic status of father									
elite and middle class	1.093	0.387		1.113	0.303		1.117	0.292	
foremen & skilled workers	1.156	0.182		1.153	0.192		1.144	0.218	
lower-skilled workers	0.787	0.073	*	0.801	0.097	*	0.800	0.094	*
unskilled workers (ref.)	1	/		1	/		1	/	
farmers, fishermen and farm workers	0.517	0.007	***	0.530	0.013	**	0.533	0.014	**
no occupational registration	0.885	0.412		0.874	0.370		0.861	0.318	
Period									
< 1870	1	/		1	/		1	/	
1870-1890	1.607	0.000	***	1.613	0.000	***	1.627	0.000	***
> 1890	2.000	0.000	***	1.996	0.000	***	2.006	0.000	***
Migration status in city of Antwerp									
native couple (ref.)				1	/		1	/	
migrant couple				0.823	0.013	**			
only father migrant							0.838	0.139	
only mother migrant							0,872	0.184	
both parents migrant							0,768	0.011	**
N birth intervals	3033			3033			3033		
N couples	747			747			747		
Pseudo R² (p< 0.0001)	0.2221			0.2232			0.2234		

Note: SE adjusted for clustering of observations within couples
P-values: * p<0.10; ** p<0.05; *** p<0.01
Source: same as Figure 3.

Table 5: Logistic Regression of the Probability of Birth Stopping by Migrant Groups, City of Antwerp, 1810-1925

	MODEL 4a			MODEL 4b			MODEL 4c			MODEL 4d		
	Native			Only father migrant			Only mother migrant			Both parents migrant		
	Odds Ratio	P-value		Odds Ratio	P-value		Odds Ratio	P-value		Odds Ratio	P-value	
Age of mother												
15-24	0.186	0.000	***	0.147	0.000	***	0.145	0.000	***	0.160	0.000	***
25-29	0.566	0.017	**	0.301	0.001	***	0.290	0.000	***	0.418	0.005	***
30-34 (ref.)	1	/		1	/		1	/		1	/	
35-39	3.281	0.000	***	2.777	0.009	***	1.534	0.264		1.839	0.078	*
>=40	25.907	0.000	***	17.662	0.000	***	34.060	0.000	***	14.610	0.000	***
no exact date known	0.796	0.499		2.903	0.219		0.527	0.266		0.948	0.900	
Age difference between spouses												
husband is younger than wife	0.767	0.125		0.461	0.019	**	0.420	0.001	***	0.407	0.000	***
husband same age or < 6 years older than wife (ref.)	1	/		1	/		1	/		1	/	
husband is older than wife by 6+ years	0.816	0.392		1.426	0.210		0.979	0.933		1.243	0.346	
missing information	1.078	0.799		0.296	0.171		0.924	0.872		0.722	0.328	
Parity	0.651	0.000	***	0.703	0.000	***	0.668	0.000	***	0.677	0.000	***
Life status of index child												
alive (ref.)	1	/		1	/		1	/		1	/	
died within 2 years	1.823	0.041	**	0.702	0.527		1.710	0.173		2.773	0.001	***
died after 2 years	3.665	0.007	***	1.722	0.315		2.056	0.169		2.920	0.167	

Table 5 continued…												
Socio-economic status of father												
elite and middle class	0.970	0.849		1.194	0.589		1.113	0.673		1.299	0.164	
foremen & skilled workers	1.091	0.598		1.499	0.136		0.801	0.473		1.611	0.090	*
lower-skilled workers	0.994	0.980		0.505	0.078	*	0.931	0.797		0.733	0.229	
unskilled workers (ref.)	1	/		1	/		1	/		1	/	
farmers, fishermen and farm workers	0.277	0.066	*	0.762	0.526		0.246	0.000	***	0.708	0.414	
no occupational registration	0.768	0.209		0.802	0.404		0.805	0.533		0.636	0.244	
Period												
< 1870	1	/		1	/		1	/		1	/	
1870-1890	1.880	0.000	***	2.025	0.012	**	1.663	0.058	*	1.127	0.558	
> 1890	2.497	0.000	***	2.909	0.001	***	2.357	0.002	***	1.151	0.489	
N birth intervals	1215			451			704			663		
N couples	303			111			157			176		
Pseudo R^2 ($p < 0.0001$)	0.2243			0.2313			0.2817			0.2196		

Note: SE adjusted for clustering of observations within couples

P-values: * $p<0.10$; ** $p<0.05$; *** $p<0.01$

Source: same as Figure 3.

Table 6: Logistic Regression of the Probability of Birth Stopping with Region of Origin, City of Antwerp, 1810-1925

	MODEL 5 †			MODEL 5a †		MODEL 5b †			MODEL 5c †	
	All couples			Only father migrant		Only mother migrant			Both parents migrant	
	Odds Ratio	P-value		Odds Ratio	P-value	Odds Ratio	P-value		Odds Ratio	P-value
Region of origin of mother										
city of Antwerp (ref.)	1	/				1	/		1	/
Antwerp district, rural area	0.785	0.372				0.474	0.152		0.783	0.681
Antwerp district, semi-rural area	0.988	0.949				0.738	0.457		0.986	0.973
Antwerp district, urban area	0.672	0.153				0.540	0.167		0.550	0.240
Flemish provinces	0.815	0.060	*			0.669	0.173		0.887	0.774
Walloon provinces or Brussel	1.067	0.696				0.617	0.187		1.390	0.480
The Netherlands	0.606	0.028	**			0.319	0.010	**	0.884	0.818
France	3.189	0.000	***			2.011	0.184		(n.a.)	(n.a.)
Other foreign countries	0.648	0.257				0.296	0.234		0.740	0.577
Unknown	0.873	0.665				0.530	0.199		(n.a.)	(n.a.)
Region of origin of father										
city of Antwerp (ref.)	1	/		1	/				1	/
Antwerp district, rural area	1.101	0.764		2.633	0.562				0.990	0.988
Antwerp district, semi-rural area	0.691	0.061	*	2.092	0.639				0.645	0.420
Antwerp district, urban area	1.200	0.361		3.505	0.438				1.654	0.404
Flemish provinces	0.900	0.312		3.574	0.416				0.824	0.712
Walloon provinces or Brussel	0.880	0.395		2.733	0.529				0.750	0.625
The Netherlands	1.347	0.372		3.904	0.437				1.159	0.803
France	0.909	0.487		2.403	0.602				0.561	0.384
Other foreign countries	0.734	0.223		1.756	0.715				0.906	0.871
Unknown	1.039	0.893		(n.a.)	(n.a.)				(n.a.)	(n.a.)

Table 6 continued…						
N birth intervals	3033		451	704		663
N couples	747		111	157		176
Pseudo R^2 ($p < 0.0001$)	0.2265		0.2393	0.2908		0.2299

Note: SE adjusted for clustering of observations within couples

† model controlled for mother's age, age difference between spouses, parity, life status of index child, socio-economic status of father and period

P-values: * $p<0.10$; ** $p<0.05$; *** $p<0.01$

n.a. = not applicable

Source: same as Figure 3.

Table 7: Logistic Regression of the Probability of Birth Stopping with Timing of Immigration, City of Antwerp, 1810-1925

	MODEL 6 †			MODEL 6a †		MODEL 6b †			MODEL 6c †	
	All couples			Only father migrant		Only mother migrant			Both parents migrant	
	Odds Ratio	P-value		Odds Ratio	P-value	Odds Ratio	P-value		Odds Ratio	P-value
Age of mother at immigration to Antwerp										
born in Antwerp (native) (ref.)	1	/				1	/		1	/
before age <15	1.224	0.184				1.591	0.074	*	0.913	0.881
after age 15 & before marriage	0.939	0.720				(n.a.)	(n.a.)		0.627	0.448
after marriage	0.631	0.016	**			0.809	0.437		0.386	0.103
no exact date known	(n.a.)	(n.a.)				0.833	0.676		(n.a.)	(n.a.)
Age of father at immigration to Antwerp										
born in Antwerp (native) (ref.)	1	/		1	/				1	/
before age <15	1.121	0.450		1.807	0.184					
after age 15 & before marriage	0.894	0.527		0.949	0.892				0.882	0.680
after marriage	0.648	0.021	**	0.574	0.223				0.669	0.216
no exact date known	0.850	0.280		(n.a.)	(n.a.)				0.746	0.445
N birth intervals	3033			451		704			663	
N couples	747			111		157			176	
Pseudo R² (p< 0.0001)	0.2229			0.2437		0.2883			0.2311	

Note: SE adjusted for clustering of observations within couples † model controlled for mother's age, age difference between spouses, parity, life status of index child, socio-economic status of father and period

P-values: * p<0.10; ** p<0.05; *** p<0.01

n.a. = not applicable

Source: same as Figure 3.

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